



Dr Al-Rahim Habib
Doctor in Training Research
Scholarship recipient 2021,
Early Career Research
Program grant recipient 2022

Using artificial intelligence to beat ear disease in Indigenous children



Dr Al-Rahim Habib, unaccredited ear, nose and throat registrar

An innovative artificial intelligence (AI) tool shown to accurately triage ear disease in rural and remote Indigenous children, was developed with the support of a 2021 Avant Doctor in Training Research award. The project team is now building on its initial findings, supported by further funding from Avant.

The idea for the algorithm, DrumBeat.ai, was conceived by otolaryngology registrar, Dr Al-Rahim Habib, in conjunction with senior ENT mentors during his internship in the Northern Territory, where he observed the challenges Aboriginal and Torres Strait Islander children face accessing tertiary ENT services. In fact, rural and remote-dwelling Indigenous Australian children experience the highest rates of ear disease in the world.

A shortage of rural and remote area ENT specialists and the limitations of telehealth can lead to delays in triage and early treatment, increasing the risk of detrimental hearing loss, and adversely affecting language development, academic performance and quality of life.

"The overarching purpose of DrumBeat.ai is to enhance the capacity of frontline healthcare workers in rural and remote areas to quickly identify ear disease, inform judgment, and improve clinical decision-making," Dr Habib explains. "This project has the potential to profoundly improve the daily life, academic performance and future employment prospects for Aboriginal children living in these areas."

World-first database of eardrum images improves early detection and action

DrumBeat.ai is the first tool of its kind and is comparable to ENT experts at recognising normal and abnormal eardrums and detecting hearing loss. Using the tool, healthcare workers can identify children who need to see a specialist, and predict high-risk children needing urgent treatment to prevent infection or permanent hearing loss.

With this award, Dr Habib and his team developed an algorithm using more than 10,000 otoscopic eardrum images from over 4,000 Aboriginal and Torres Strait Islander children, from more than 100 rural and remote communities in the Northern Territory and Queensland.

The DrumBeat.ai project is a collaboration between Indigenous community leaders and healthcare professionals, including the Deadly Ears Program, the departments of Otolaryngology – Head and Neck Surgery at the Royal Darwin Hospital and Westmead Hospital, University of Sydney, University of Queensland, Griffith University, and Microsoft's AI for Good Lab.

Further funding will help research team explore integration into clinical practice

Benefiting from further funding from Avant in 2022 through the Early Career Research Program will allow Dr Habib and his team to progress his research – something they could not do otherwise.

"I am grateful to Avant for supporting our research two years in a row. This grant provided me the opportunity to explore an area of research which I am passionate about and to continue my clinical role," Dr Habib reflects. "Avant's support last year granted us an incredible opportunity to refine our existing models and explore how they could be applied in Australia and abroad. Our team published two manuscripts in international peer-reviewed scientific journals. I was able to present our findings at national and international scientific conferences and share our research with the public through news articles, radio and online interviews. We now have the opportunity to expand our research questions and work towards revolutionising telehealth services by integrating AI into existing clinical workflows."

The next stage of Dr Habib's research moves from lab-based simulations to real-world testing in 2023, building on the success of the initial project.

"Our previous research demonstrated substantial performance in virtual training environments," Dr Habib says. "This year, we are exploring how we can integrate the algorithm into daily clinical practice, to improve efficiency and time-to-treatment, and reduce costs by focusing resources on children who need specialist care. We anticipate that successful completion of this project will lead to real-world translation in the near future."